**Quarterly Surveillance Report**
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## Interpreting Local Surveillance Data on Cancer Screening Participation

The Behavioral Risk Factor Surveillance System (BRFSS) is a collaborative effort between the Centers for Disease Control and Prevention (CDC) and states to monitor selected behaviors and health indicators across the country.[1] It is based on anonymous telephone interviews of adult participants contacted by random-digit dialing. BRFSS was originally developed to provide state-level data but there has been increasing demand for local data.

In 2002, CDC began releasing Selected Metropolitan/Micropolitan Area Risk Trends (SMART) BRFSS prevalence estimates for some topics, including cancer screening participation.[2] SMART estimates are available for some Metropolitan or Micropolitan Statistical Areas (MSAs) used by the US Census Bureau. Micropolitan statistical areas contain at least one urban area with a population between 10,000 and 49,999; metropolitan statistical areas contain at least one urban area with a population of 50,000 or greater. To be included in CDC SMART BRFSS reporting, an MSA must have at least 500 completed interviews and must meet certain other numeric criteria in order to provide statistically reliable estimates.

Four areas in Montana were included in SMART BRFSS reporting in 2006: the Billings Metropolitan Statistical Area (comprised of Yellowstone and Carbon Counties), the Great Falls Metropolitan Statistical Area (Cascade County), the Missoula Metropolitan Statistical Area (Missoula County) and the Kalispell Micropolitan Statistical Area (Flathead County). These are named for their major cities but county-level estimates may also be available for these regions. Only the Billings MSA has SMART BRFSS reports for prior years (2004 and 2005, but cancer screening participation questions have only been asked in even years since 2000).

The local prevalence estimates provided by SMART BRFSS must be interpreted with caution. CDC provides the following guidelines:[2]

- In comparing SMART areas to the state as a whole, to other areas, or across years within an area, it is necessary to use Confidence Intervals (CI) to evaluate differences between prevalence estimates. A CI measures the uncertainly around an estimate. If CIs overlap, the estimates should not be interpreted as different, even though they may look quite different.

- SMART sample sizes are too small to support reliable analysis by categories such as sex, age group, race, education, or income. Many behaviors, including cancer screening participation, vary by these factors. The populations within SMART

[1] http://www.cdc.gov/brfss/
[2] http://apps.nccd.cdc.gov/brfss-smart/index.asp

geographic units may also vary by these factors.

- SMART estimates are not available if the total number of respondents for a question (denominator) is less than 50. Estimates should be evaluated carefully if the number of respondents in a cell (numerator) is less than 50.

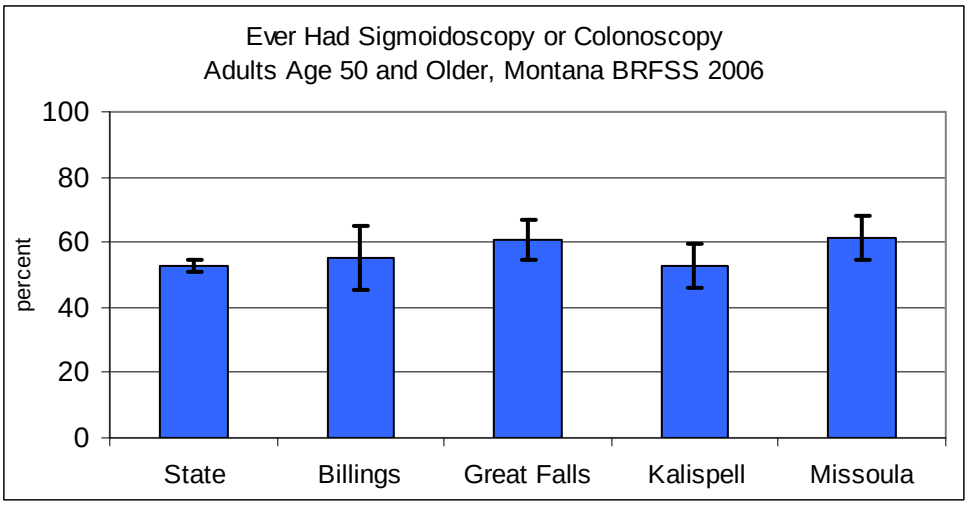
- A SMART estimate is not available if the CI is greater than ± 10.

Our surveillance data are based on projecting statewide prevalence estimates from samples of participants whom we hope represent the total population accurately. On the whole, random-digit dialing and a procedure called weighting (assigning each participant a number or statistical weight for analysis to reflect the fact that he or she represent many other similar individuals based on sex, age, race, and county of residence) results in a sample that resembles the state population fairly closely. Nevertheless, there is an element of uncertainty arising from this process, and this uncertainty is measured by the CI around the prevalence estimate. It is conventional to use a 95% CI, indicating that the true value of the prevalence is within that interval with 95% certainty. Other CIs (e.g., 90%, 99%) are used less often.

The graphs and tables on the facing page present estimated colorectal and breast cancer screening participation among age-eligible Montana adults statewide and in the four SMART regions in 2006. Although the prevalence estimates for ever having a sigmoidoscopy or colonoscopy range from 52.7% to 61.5%, none can be considered different from any of the others because all the CIs overlap. Participation rates are not statistically different for mammography in spite of the apparently large difference between the extreme values of 73.8% and 83.0%, because the CIs for all the estimates overlap.

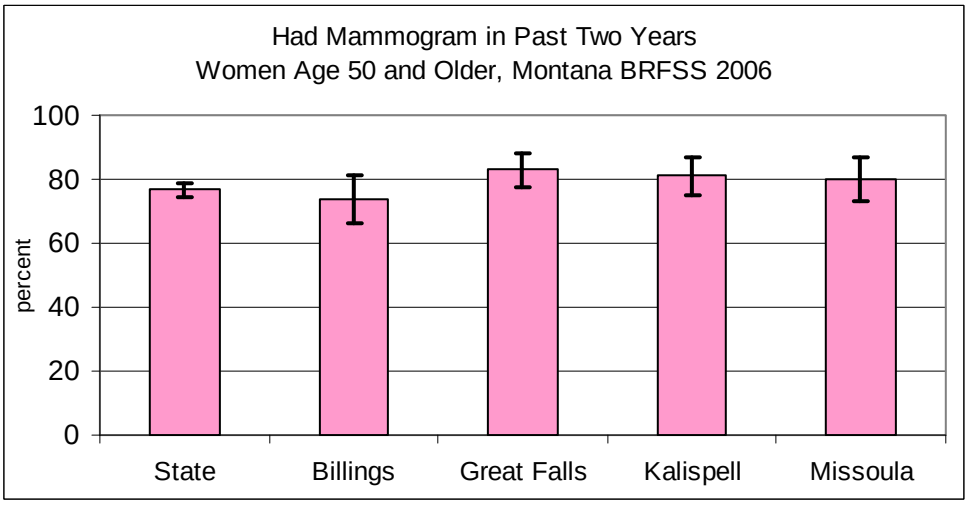
If CIs overlap, the estimates should not be described as different. It is common to see descriptions such as "screening participation is higher in Community X than elsewhere although the difference does not achieve the .05 level of statistical significance." This may be done to focus on the apparent difference between estimates rather than on the likelihood that the difference is real.

In general, the smaller the sample size, the larger the CI around a prevalence estimate. In these examples, there were at least 500 total respondents from each SMART MSA, but there were only 198 to 302 age-eligible adults for the colonoscopy question in each MSA, and only 160 to 185 age-eligible women for the mammography question. The CIs around the estimates were ± 6.0% or greater for colonoscopy for the MSAs and ± 5.5% or greater for mammography. It is not feasible to increase the local sample sizes enough to achieve more precise estimates of local screening participation, although in certain circumstances it may be possible to combine several years of data, provided prevalence rates have not changed rapidly over time. For most of the cancer screening participation questions, prevalence rates statewide have been fairly stable for several survey cycles.




Vertical bars are 95% Confidence Intervals.

| Ever Had Sigmoidoscopy or Colonoscopy Adults Age 50 and Older, Montana BRFSS 2006 | | |
|---|---|---|
| | Estimate, % | 95% Confidence Interval |
| Statewide | 52.9 | 50.9 - 54.9 |
| Billings MSA | 55.3 | 51.7 - 65.0 |
| Great Falls MSA | 60.9 | 54.8 - 66.9 |
| Kalispell MSA | 52.7 | 46.0 - 59.3 |
| Missoula MSA | 61.5 | 54.8 - 68.1 |




Vertical bars are 95% Confidence Intervals.

| Had Mammogram Within Past Two Years, Women Age 50 and Older, Montana BRFSS 2006 | | |
|---|---|---|
| | Estimate, % | 95% Confidence Interval |
| Statewide | 76.6 | 74.4 - 78.8 |
| Billings MSA | 73.8 | 66.1 - 81.4 |
| Great Falls MSA | 83.0 | 77.5 - 88.4 |
| Kalispell MSA | 81.0 | 74.9 - 87.0 |
| Missoula MSA | 80.0 | 72.9 - 87.1 |

The table below shows the effect of sample size on CIs around mammography prevalence for the statewide BRFSS from 1995 through 2006, as the total number of participants in BRFSS increased from approximately 1,200 to more than 6,000 and the number of age-eligible women increased from 227 to 1,990. It is possible to identify a trend of increasing mammography participation across the 12 years although, with the exception of 1999 and 2000, no pairs of adjacent years are statistically significantly different.

| The Effect of Sample Size on the Precision of Estimated Prevalence of Mammography Montana BRFSS 1995 to 2006 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2002 | 2004 | 2006 |
| Sample size | 277 | 423 | 450 | 446 | 480 | 790 | 1,095 | 1,553 | 1,990 |
| Prevalence, % | 63.8 | 68.8 | 70.4 | 72.3 | 71.2 | 79.3 | 76.2 | 77.7 | 76.6 |
| Confidence Interval, ± % | 6.2 | 4.8 | 4.4 | 4.3 | 4.2 | 3.3 | 3.2 | 2.5 | 2.2 |

The number of respondents almost doubled between 1995 and 1999, reducing the Confidence Interval from ± 6.2% to ± 4.2%. Between 1999 and 2006, the number of respondents quadrupled, reducing the Confidence Interval to ± 2.2%. This reflects excellent precision for the statewide prevalence estimates in recent years, but also illustrates the large numbers that would be required to increase the precision of local estimates.

**Please visit our website at www.cancer.mt.gov**

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